REMARKS/ARGUMENTS

This Amendment is being filed in response to a second, non-final Official Action following a Request for Continued Examination (RCE) of the above-identified application. The Official Action no longer rejects all of the pending claims, namely Claims 1-5 and 11-15, under 35 U.S.C. § 102(e) as being anticipated by US Patent Application Publication No. 2004/0146014 to Hammons, Jr. et al. Instead, the Official Action now rejects all of the pending claims under 35 U.S.C. § 103(a) as being unpatentable over Hammons. As explained below, contrary to the allegations of the Official Action, Applicant respectfully submits that the claimed invention is patentably distinct from Hammons and, accordingly, traverses this rejection of the claims. Nonetheless, Applicant has amended various ones of the claims to further clarify the claimed invention. In view of the amendments to the claims and the remarks presented herein, Applicant respectfully requests reconsideration and allowance of all of the pending claims of the present application.

As previously noted, Hammons discloses a system and method for designing space-time codes to achieve full spatial diversity over fading channels. As disclosed, the system and method present general binary design criteria for phase shift keying or PSK-modulated space-time codes. In this regard, design criterion may include, for linear binary phase-shift keying (PSK) (BPSK) codes and quadrature PSK (QPSK) codes, the rank (i.e., binary projections) of the unmodulated code words, as binary matrices over the binary field.

According to one aspect of the claimed invention, as embodied in amended independent Claim 1, an apparatus is provided for a communication system in which space-time encoded data is transmitted at a first location and at least at a second location for communication to a receive station. As recited, the apparatus includes a decoder coupled to receive indications of received values of the space-time encoded data received at the receive station. The decoder is also for directly combining the received values of the space-time encoded data transmitted from different ones of the first and at least second locations to the receive station. Once directly combined, the received values of the space-time encoded data form a real-valued vector, free of imaginary component parts. The decoder may then further be for detecting values of symbols of which the space-time encoded data is formed. In this regard, the decoder is for detecting the values as a

function of the real-valued vector into which the received values are directly combined, where the function is devoid of any complex matrices.

In contrast to independent Claim 1, Hammons does not teach or suggest a decoder for directly combining received values of space-time encoded data such that the combined values form a real-valued vector free of imaginary component parts, and for detecting values of symbols of which the space-time encoded data is formed, as a function of the real-valued vector into which the received values are directly combined. Hammons does briefly disclose a space-time decoder for decoding space-time codes. Hammons does not, however, disclose the manner by which the decoder decodes those codes, much less in a manner corresponding to that of amended independent Claim 1. Instead, as indicated above, Hammons is concerned with the design of space-time codes for multi-antenna communication systems. In fact, Hammons explicitly states that, "[t]he present invention is concerned primarily with the design of space-time codes rather than the signal processing required to decode them. In most cases, the decoding employs known signal processing used for maximum likelihood reception." Hammons, paragraph 56.

The Official Action again cites equations (1) and (2) of Hammons as support for the claim recitation of directly combining received values of space-time encoded data such that the combined values form a real-valued vector free of imaginary component parts, the Official Action now alleging that those equations inherently disclose a real-valued vector. The Official Action concedes that Hammons does not teach or suggest a decoder for detecting values of symbols of which the space-time encoded data is formed, based upon the real-valued vector into which the received values are directly combined. But the Official Action alleges that BPSK symbols do not have complex values, and for the case of detecting values of BPSK symbols, it would have been obvious for Hammons' system to detect values only based on a real-valued vector.

As to the assertion with respect to equations (1) and (2) of Hammons, the Official Action appears to be asserting that any complex vector includes a pair of real-valued vectors that form the real and imaginary parts of the complex vector. Even if this assertion is accurate, however, Hammons still does not teach or suggest detecting the values of symbols as a function of the real-valued vector into which the received values are directly combined, where the function is

devoid of any complex matrices, as now recited by amended independent Claim 1 (see, e.g., equations 12 and 13 of the present application). At a minimum, the Official Action's assertion ignores the fact that even in the case of BPSK symbols, the received signal still has complex components attributed to a complex path gain and complex Gaussian noise. *See*, e.g., Hammons, equation (1) (including complex path gain α_{ij}, and complex Gaussian random variable [n_t^j]); and equation (2) (including complex variables n_t^j and α_{ij}).

For purposes of further illustration, Applicant notes that Hammons discusses its system and method with respect to a flat-fading channel, while the present application discusses its system and method with respect to a multipath fading channel. As Hammons clearly says in paragraph [0011] and with respect to equation (1), the α_{ij} is "the complex path gain from transmit antenna i to receive antenna j." Compare this with at least equation 1 (and equation 4) in the present application, which clearly shows that the path between transmit antenna m and receive antenna l is a multipath channel. This presents the present application in a totally different perspective than Hammons. The present application deals with intersymbol interference due to a multipath channel, while Hammons does not address this problem.

Applicant therefore respectfully submits that amended independent Claim 1, and by dependency Claims 2-5, is patentably distinct from Hammons. Applicant also respectfully submits that amended independent Claim 11 recites subject matter similar to that of amended independent Claim 1, including the aforementioned decoding features. As such, Applicant respectfully submits that amended independent Claim 11, and by dependency Claims 12-15, is also patentably distinct from Hammons, for at least the same reasons given above with respect to independent Claim 1.

For at least the foregoing reasons, Applicant respectfully submits that the rejection of all of the pending claims as being unpatentable over Hammons is overcome.

CONCLUSION

In view of the amendments to the claims and the remarks presented above, Applicant respectfully submits that the present application is in condition for allowance. As such, the issuance of a Notice of Allowance is therefore respectfully requested. In order to expedite the examination of the present application, the Examiner is encouraged to contact Applicant's undersigned attorney in order to resolve any remaining issues.

It is not believed that extensions of time or fees for net addition of claims are required, beyond those that may otherwise be provided for in documents accompanying this paper. However, in the event that additional extensions of time are necessary to allow consideration of this paper, such extensions are hereby petitioned under 37 CFR § 1.136(a), and any fee required therefore (including fees for net addition of claims) is hereby authorized to be charged to Deposit Account No. 16-0605.

Respectfully submitted,

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LEGAL02/30848625v1

ELECTRONICALLY FILED USING THE EFS-WEB ELECTRONIC FILING SYSTEM OF THE UNITED STATES PATENT & TRADEMARK OFFICE ON JUNE 19, 2008.